DYADIC EXAMINATION OF POSTTRAUMATIC STRESS SYMPTOMS, RELATIONSHIP SATISFACTION, AND POTENTIAL MEDIATORS IN MILITARY COUPLES

by

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STATEMENT OF DISSERTATION APPROVAL

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ABSTRACT

The current study investigated the mechanisms through which posttraumatic stress (PTS) symptoms are associated with relationship functioning in a sample of 219 National Guard veterans and their partners. Veterans completed questionnaires regarding PTS symptoms, physical and verbal aggression, levels of communication, and relationship satisfaction. Partners reported on veterans' physical and verbal aggression and their own relationship satisfaction. Confirmatory factor analyses indicated that a Five-factor Model of PTS had the best relative fit for PTS symptoms reported by the veterans. Dyadic analyses via path analysis found significant negative relations between veterans' numbing symptoms and both veterans' and partners' relationship satisfaction, with an additional negative effect of avoidance and positive effect of reexperiencing on partners' relationship satisfaction. All other paths were nonsignificant. A second path analysis examined communication and aggression as mediators of the associations between symptom clusters and relationship satisfaction in both partners, using bootstrapping with 5000 resamples. Again, significant negative direct effects for the numbing cluster on both veterans' and partners' relationship satisfaction were found, with an additional negative direct effect of avoidance and positive direct effect of reexperiencing symptoms on partners' relationship satisfaction. Numbing also exerted a significant indirect effect on veterans' relationship satisfaction, and a marginally significant indirect effect on partners' relationship satisfaction via communication.

Finally, anxious-arousal had a significant indirect effect on partner's relationship satisfaction via partners' report of veterans' aggression. These findings add to the growing literature that suggests that symptoms of emotional numbing are particularly detrimental to relationship functioning for both veterans and partners and that this is explained in part by impaired communication. Potential implications of these findings and future research needs are discussed.

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LIST OF ABBREVIATIONS

1. PTSD = Posttraumatic Stress Disorder
2. PTS = Posttraumatic Stress
3. DSM-IV = Diagnostic and Statistical Manual of Mental Disorders 4th Ed.
4. PCL = PTSD Checklist
5. RAS = Relationship Assessment Scale
6. AQ = Aggression Questionnaire
7. CFA = Confirmatory Factor Analysis
8. AIC = Akaike Information Criterion
9. RMSEA = Root Mean Square Error of Approximation
10. CFI = Comparative Fit Index
11. NFI = Normed Fit Index
12. df = degrees of freedom
13. APIM = Actor Partner Interdependence Model
14. RS = Relationship Satisfaction
15. HLM = Hierarchical Linear Modeling

INTRODUCTION

Numerous studies have documented the negative sequelae of combat deployments among veterans (e.g., Evans, McHugh, Hopwood, & Watt, 2003; Kulka, Schlenger, Fairbank, Hough, Jordan, Marmar, et al., 1990), including posttraumatic stress disorder (PTSD; e.g., see review and meta-analysis by Magruder & Yeager, 2009; Prigerson, Maciejewski, & Rosenheck, 2001). In turn, veterans with PTSD are more likely than veterans without PTSD to experience higher rates of other psychological problems and relationship distress (e.g., Hoge, Castro, Messer, McGurk, Cotting, & Koffman, 2004; Meis, Barry, Kehle, Erbes, & Polusny, 2010; Riggs, Byrne, Weathers, & Litz, 1998; Seal, Metzler, Gima, Bertenthal, Maguen, & Marmar, 2009; Thomas, Wilk, Riviere, McGurk, Castro, & Hoge, 2010). Studies show that, compared to veterans without PTSD, veterans with PTSD report diminished intimacy and relationship satisfaction, are 2-3 times more likely to divorce, and are three times more likely to commit intimate aggression (e.g., Byrne & Riggs, 1996; Galovski & Lyons, 2004; Goff, Crow, Reisbig, & Hamilton, 2007; Jordan, Marmar, Fairbank, Schlenger, Kulka, Hough, & Weiss, 1992; Kulka et al.; Riggs et al.). In addition, similar associations have been detected even at subclinical levels of posttraumatic stress (PTS) symptoms in veterans (e.g., Renshaw, Rodrigues, & Jones, 2009).

Not surprisingly, spouses of veterans with PTSD themselves report elevated levels of psychological and relationship distress (meta-analysis by Lambert, Engh,

Hasbun, & Holzer, 2012). Such spouses report increased family dysfunction (i.e., cohesion, adaptability, and communication), relationship dissatisfaction, intimacy difficulties, marital problems, intimate partner violence, and lower levels of happiness and life satisfaction than spouses of veterans without PTSD (e.g., Dekel, Solomon, & Bleich, 2005; Hendrix, Erdmann, & Briggs, 1998; Jordan et al., 1992; Riggs, et al., 1998; Solomon, Waysman, Avitzur, & Enoch, 1991). Again, similar patterns are found for partners of veterans with subclinical levels of PTS symptoms (e.g., Renshaw, Rodrigues, & Jones, 2008).

The relation between PTS and relationship functioning may be bidirectional, given that studies also have shown that relationship difficulties may contribute to the exacerbation of mental health problems in veterans. An especially robust finding is the negative association between social support and PTSD (meta-analyses by Brewin, Andrews, & Valentine, 2000; Ozer, Best, Lipsey, & Weiss, 2003). In addition, recent studies have shown that veterans who report poorer family functioning experience an increase in PTS symptoms (Evans, Cowlishaw, Forbes, Parslow, & Lewis, 2010); moreover, veterans who reported supportive relationships are significantly more likely to seek mental health services than those who reported poor relationships (Meis, et al., 2010). These findings suggest that veterans may be at risk for entering into a vicious cycle whereby PTS symptoms contribute to poorer relationship functioning, which in turn exacerbates symptoms of PTS, which further corrodes relationship functioning. The treatment implications of this pattern are numerous (e.g., suggesting the value of including spouses in treatment) and underscore the importance of further investigating the associations between PTS symptoms and relationship functioning.

Researchers have begun to explore the potential mechanisms through which PTS symptoms impact relationship functioning, by differentiating among specific PTS symptom clusters regarding their impacts on the relationship functioning of veterans and their spouses. There are several alternative models of PTS symptom clusters in the literature. The Diagnostic and Statistical Manual 4th Edition (DSM-IV) three-cluster model separates PTS symptoms into three main clusters: reexperiencing, avoidance, and hyperarousal (American Psychiatric Association, 2000). Empirical research, however, has supported three more complex models. A four-cluster numbing model separates symptoms in the avoidance cluster into effortful avoidance and numbing, resulting in four clusters: reexperiencing, avoidance, hyperarousal, and numbing (King, Leskin, King, & Weathers, 1998). An additional four-cluster dysphoria model separates symptoms of emotional numbing from the avoidance cluster and symptoms of general distress from the hyperarousal cluster and combines them into a dysphoria cluster, resulting in four clusters: reexperiencing, avoidance, hyperarousal, and dysphoria (Simms, Watson, & Doebbeling, 2002). Finally, a five-factor model recently has been posited that also separates symptoms of emotional numbing from the avoidance cluster and symptoms of general distress from the hyperarousal cluster, but keeps them in two separate clusters, resulting in five-factors: reexperiencing, avoidance, numbing, dysphoric arousal, and anxious arousal (Elhai, Biehn, Armour, Klopper, Frueh, & Palmieri, 2011; Wang, Long, Li, & Armour, 2011). A recent meta-analysis of 40 studies indicated that the four-factor models consistently had a better fit on measures of PTS symptomatology than other cluster models, with some evidence of slight superiority for the dysphoria model (Yufik & Simms, 2010). However, Elhai and Palmieri (2011) highlight several variables that

moderate which model best fits PTS symptoms, such as the assessment measure being used, the phrasing of questions, and the study sample, thus highlighting the need for further research in this area. In addition to these limitations, two recent studies have found empirical support for the superiority of a five-factor model of PTS over the four factor models in different samples (adolescents and adults) and different traumas (natural disaster and violence; Elhai, Biehn, et al., 2011; Wang, Li, Shi, Zhang, Zhang, Liu, & Elhai, 2011).

Despite the differences in these models of the factor structure of measures of PTS symptoms, the literature consistently demonstrates that the symptoms of emotional numbing, hyperarousal, and dysphoria are particularly detrimental to relationship functioning. In a study using the DSM-IV three-cluster model of PTS symptoms, Riggs and colleagues (1998) found that, compared to reexperiencing and hyperarousal, the avoidance cluster of PTS symptoms was more strongly related to increased relationship distress for both veterans and their spouses. Follow-up analyses revealed that emotional numbing was more strongly correlated with relationship quality than other symptoms of avoidance. Several subsequent studies using the four-cluster emotional numbing model have supported the notion that symptoms of emotional numbing are related to increased relationship distress and poorer family adjustment more than other symptom clusters (e.g., Cook, Riggs, Thompson, Coyne, & Sheikh, 2004; Monson, Fredman, & Taft, 2011; Riggs et al., 1998; Taft, Watkins, Stafford, Street, & Monson, 2011).

In their attempts to investigate the potential mechanisms through which emotional numbing may contribute to relationship distress, researchers have found that emotional numbing is related to impaired communication (e.g., empathy/understanding, emotional

engagement), decreased self-disclosure and emotional sharing, less physical intimacy and sexual interest, and increased feelings of detachment (e.g., Cook, et al., 2004; Monson, Taft, & Fredman, 2009; Sherman, Zanotti, & Jones, 2005; Taft, Schumm, Panuzio, & Proctor, 2008). However, only one study to date has tested any of these mechanisms in a mediational model: Solomon, Dekel, and Zerach (2008) found that veterans' self-report of PTS-related emotional numbing predicted lower levels of emotional disclosure, which in turn predicted poorer marital intimacy, above and beyond all other symptoms clusters. Unfortunately, this study examined only veterans' self-report, and it is likely that veterans reporting low marital intimacy would be more likely to also endorse symptoms of emotional numbing.

Researchers also have found a negative relation between PTS symptoms of hyperarousal and relationship functioning, although not as robust as that involving emotional numbing (e.g., Monson, et al., 2009; Novaco & Chemtob, 1998; Savarese, Suvak, King, & King, 2001). Symptoms of hyperarousal have been found to be associated with increased relationship violence, marital dysfunction, substance abuse, tension, stress, and impairment in recreational, family, and friend domains (e.g., Allen, Rhoades, Stanley, & Markman, 2010; Evans, et al., 2010; Galovski & Lyons, 2004; Monson, et al., 2011; Orcutt, King, & King, 2003; Riggs, et al., 1998; Sherman, Sautter, Jackson, Lyons, & Han, 2006). However, the positive association between PTS symptoms of hyperarousal and negative sequelae is not consistently found. Some researchers have failed to find a significant relation between PTS symptoms of hyperarousal and general relationship functioning (e.g., Cook, et al., 2004; Riggs et al., 1998), and others have found that the relation between PTS symptoms of hyperarousal

and general relationship functioning was nonsignificant once the PTS symptoms of emotional numbing were accounted for (e.g., Monson, Fredman, & Dekel, 2010; Taft, et al., 2008). Despite the more equivocal nature of results for hyperarousal, researchers have found that trait anger, increased aggression (both verbal and physical) in the form of violent outbursts, expressing hostility, and poor anger control are all significant mediators of the association between hyperarousal and general relationship functioning (e.g., Solomon, et al., 2008; Taft, Street, Marshall, Dowdall, & Riggs, 2007).

The potential overlap between PTS symptoms of emotional-numbing and hyperarousal (e.g., aggression related to detachment and poor emotional expression) and their similarity to general symptoms of distress is reflected in the four-cluster dysphoria model of PTS symptoms. Although the research reviewed above has shown that the symptoms that make up the dysphoria factor (numbing and part of hyperarousal) are related to decreased relationship functioning, only two studies to date have examined the relation between a specifically defined dysphoria cluster of PTS symptoms and relationship functioning. In a study of National Guard veterans, veterans' self-reported dysphoria symptoms 6 months postdeployment were more strongly related to relationship adjustment than other symptom clusters at 6 months postdeployment (Erbes, Meis, Polusny, & Compton, 2011; Erbes, Meis, Polusny, Compton, & Wadsworth, 2012). Moreover, dysphoria symptoms were the only significant factor related to relationship adjustment at 1 year postdeployment. However, these findings do not address whether the symptoms of emotional numbing might be carrying the weight of the association between the dysphoria cluster and relationship adjustment. As reviewed above, different mechanisms have been found to mediate the associations of emotional numbing and

hyperarousal with relationship functioning. Thus, it is possible that combining emotional numbing and hyperarousal into a single dysphoria cluster might obscure our understanding of the mechanisms through which symptoms of PTS influence relationship functioning.

Although the research on mechanisms through which PTS symptoms impact the psychological and relationship functioning of veterans and their spouses is growing, one significant limitation has been a reliance on veterans' self-report of relationship functioning, with only a few studies including spouses' reports of relationship functioning (e.g., Goff, et al., 2007; Renshaw & Campbell, 2011; Renshaw, Rodebaugh, & Rodrigues, 2010). Moreover, almost no studies have evaluated the association of PTS symptoms with relationship distress among military veterans and their partners dyadically, by examining both partners' reports of relationship functioning simultaneously. Kenny, Kashy, and Cook (2006) explain that variables from two individuals in a dyad (e.g., close interpersonal relationship) are *nonindependent*; that is, "two scores from two members of a dyad are more similar to (or different from) one another than are two scores from two people who are not members of the same dyad" (p. 25). A dyadic model can be used to explore the association between PTS symptoms and relationship functioning among veterans and their spouses, by assessing how veterans' scores on an independent variable (e.g., PTS symptoms) are related to their own outcome (actor effect) and their spouses' outcome (partner effects) simultaneously, while accounting for covariance in veterans' and spouses' outcomes. This model also provides researchers with a framework for examining indirect actor and partner effects through potential mechanisms/mediators.

Only two studies to date have examined the association of PTS symptoms and relationship distress among military veterans and their partners dyadically (Ein-Dor, Doron, Solomon, Mikulincer, & Shaver, 2010; Erbes, et al., 2012). Ein-Dor et al. found that dyadic processes in attachment-related anxiety were related to both veterans' PTS symptoms and spouses' distress. For example, spouses' distress was related not only to their own self-reported anxious attachment, but also to their husbands' level of self-reported anxious attachment. Erbes et al. found that veterans' total PTS symptoms at Time 1 predicted lower relationship satisfaction at Time 2 for partners, but not veterans. On the other hand, none of the individual PTS symptom clusters at Time 1 predicted partners' relationship adjustment at Time 2, but the dysphoria symptom cluster predicted veterans' relationship adjustment at Time 2. These results suggest that the totality of PTS symptoms may be more important for partners over time, whereas dysphoria symptoms in particular are more important for veterans over time. Clearly, more research is needed before drawing firm conclusions, but these differences highlight the potentially broader understanding that can be gained via examining dyadic processes in the maintenance of PTS symptoms.

In order to address these limitations in the existing literature, the current study set out to examine the direct and indirect effects of specific PTS symptom clusters on relationship functioning in both veterans and their spouses from a dyadic perspective. We first established which PTS symptom model (the traditional three-cluster model, the four-cluster numbing model, the four-cluster dysphoria model, and the five-factor model) best fit our data. We then investigated the relation between the symptom clusters from the best-fitting model and relationship satisfaction in both partners. We expected to find the

PTS symptom clusters associated with both numbing and hyperarousal to be negatively related to both veterans' and partners' relationship satisfaction. Finally, we examined veterans' level of communication and overt aggression as potential mediators/mechanisms through which these PTS symptom clusters impacted the relationship functioning of both veterans and their partners. We hypothesized that decreased communication in veterans would mediate the effects of the numbing symptom cluster on relationship satisfaction, and that increased verbal and physical aggression in veterans would mediate the effects of hyperarousal-related symptoms on relationship satisfaction.

METHOD

Participants

Participants were 219 Utah National Guard/Army Reserve male veterans who had been deployed at least once since 2001 and 213 of their female romantic partners. Veterans were deployed to Iraq (64.4%), Afghanistan (20.5%), related locations in the Middle East (8.2%), or other locations (6.8%). Veterans had been enlisted for an average of 12 years (*SD* = 8.2), 80.2% were in the Army National Guard, and 19.8% were in the Air National Guard. Veterans' mean age was 35.20 years (*SD* = 8.35), all had completed high school (78.9% had at least some college education), and 91.1% were Caucasian. Partners' mean age was 33.01 years (*SD* = 8.15), all but one had completed high school (75.0% had at least some college education), and 92.8% were Caucasian. Almost all couples were married (98.2%), with a mean length of marriage of 9.95 years (*SD* = 7.90).

Procedure

The materials and procedures used in this study were approved by the University of Utah Institutional Review Board, as well as the Utah National Guard Judge Advocate General prior to data collection. Participants were recruited through eight voluntary weekend relationship enhancement workshops hosted by the Utah National Guard from September 2007 to August 2008. During the workshops, graduate student research assistants made announcements, collected questionnaire packets, and fielded participant questions. All participants gave written consent prior to completing surveys, and veterans

and partners were instructed to complete surveys independently of one another so as to ensure accurate and unbiased reporting. Surveys took approximately 1 to 1.5 hours to complete, and couples were allowed to return completed surveys either at the conclusion of the weekend-long workshop, or to mail them back in postage-paid envelopes. Upon receipt of completed surveys, couples were compensated $10 per person. Approximately 490 couples attended the workshops, with 271 male veterans and 9 female veterans choosing to complete surveys. Due to the small number of female veterans, these nine participants were dropped from subsequent analyses. Of the male veterans who participated, 219 reported at least one deployment since 2001. These 219 veterans were included in the analyses, along with the 213 partners of these veterans who also completed measures (6 veterans participated without their partners completing packets).

Measures

PTSD Checklist (PCL; Weathers, Litz, Herman, Huska, & Keane, 1993). Veterans completed the PCL, a 17-item self-report questionnaire of symptoms related to PTSD. Items are rated on 5-point Likert scale ranging from 1 (*not at all) to* 5 (*extremely*). Items on the PCL correspond with the 17 criteria for PTSD listed in the DSM-IV (American Psychiatric Association, 1994). Participants were instructed to respond to how often they had been bothered by each symptom during the previous month. A score of 50 was recommended by the original authors as a cutoff for possible presence of PTSD in military populations (Weathers et al.), but recent studies have suggested lower scores may provide better optimization of sensitivity and specificity (e.g., Walker, Newman, Dobie, Ciechanowski, & Katon, 2002), with a score of 35 or greater found to be an

optimal cutoff for military populations still in active service (Bliese et al., 2008). The internal consistency of the PCL for the current sample was α = .94.

The PTS symptom models examined in the current study consisted of different groupings of items from the PCL into symptom clusters. The traditional three-cluster model consisted of the following PTS symptom clusters: reexperiencing (items 1-5), avoidance (items 6-12), and arousal (items 13-17). The Numbing model consisted of the following four PTS symptom clusters: reexperiencing (items 1-5), avoidance (items 6-7), numbing (items 8-12), and arousal (items 13-17). The Dysphoria model consisted of the following four PTS symptom clusters: reexperiencing (items 1-5), avoidance (items 6-7), dysphoria (items 8-15), and arousal (items 16-17). The Five-factor model consisted of the following five PTS symptom clusters: reexperiencing (PCL items 1-5), avoidance (PCL items 6-7), numbing (PCL items 8-12), dysphoric arousal (PCL items 13-15), and anxious arousal (PCL items 16-17). Cronbach's alphas for all the PCL subscales corresponding to the various symptom clusters were greater than .84.

Relationship Assessment Scale (RAS; Hendrick, 1988; Hendrick, Dicke, & Hendrick, 1998). Veterans and partners completed the RAS, a seven-item self-report scale that assesses satisfaction in close relationships. Responses are rated on a scale from 1 (*not satisfied*) to 5 (*very satisfied*). In the report of the development of the RAS, Hendrick, Dicke and Hendrick found that the RAS had high internal consistency (Cronbach's α = .86) and good convergent validity (r = .80) with the Dyadic Adjustment Scale (Spanier, 1976). In the current sample of veterans, the internal consistency for the RAS was .87, and for partners, the internal consistency of the RAS was .90.

Aggression Questionnaire (AQ; Buss & Perry, 1992). Veterans completed the AQ, a 29-item self-report questionnaire that asks participants how characteristic statements of aggression currently are of them. Items are rated on a 5-point Likert scale ranging from 1 (*extremely uncharacteristic of me*) to 5 (*extremely characteristic of me*). In the report of the development of the AQ, Buss and Perry conducted a factor analysis and found that the AQ consists of four subscales with adequate internal consistency (all Cronbach's αs > .70) and test-retest reliability (all *r*s > .70): Physical Aggression, Verbal Aggression, Anger, and Hostility. The internal consistency for the total score was also strong (Cronbach's α = .89). In addition, participants' scores on the AQ were significantly correlated with peer ratings of them on the AQ.

In the current sample of veterans, the internal consistency (Cronbach's α) for the Physical Aggression subscale was .78 and for the Verbal Aggression subscale was .66. Given the slightly low reliability for the Verbal Aggression subscale, and our focus on overall overt expressions of aggression, we explored a combined score of items from the Physical and Verbal aggression subscales (see Renshaw & Kiddie, 2012). The internal consistency of this combined scale was .84; thus, we utilized this combined score as a representation of overt aggression.

Aggression Questionnaire – Partner Report (AQ; Buss & Perry, 1992). Partners completed the 29-item AQ in regard to how characteristic the statements were about their husbands. This approach has been used in prior studies with various PTS-related scales and measures of depression and combat exposure, with indications of good internal consistency and convergent validity (Gallagher, Riggs, Byrne, & Weathers, 1998; Renshaw, Rodebaugh, & Rodrigues, 2010; Renshaw, et al., 2008; Taft, King, King,

Leskin, & Riggs, 1999). The internal consistency (Cronbach's α) of the partner report version of the AQ for the current sample was .86 for the Physical Aggression subscale, .87 for the Verbal Aggression subscale, and .90 for the combined Physical and Verbal aggression subscales. Thus, we again used the combined score of the Physical and Verbal aggression subscales as a partner-report measure of veteran's overt aggression.

Communication variable. An explicit measure of communication was not included in the current study. However, eight line items taken from four different measures asked veterans to rate the degree of communication they had with their partner or family. A series of Confirmatory Factor Analyses in Amos identified four of those items as strongly indicative of one latent variable. Three of the final items were taken from the Multidimensional Scale of Perceived Social Support (MSPSS; Zimet, Dahlem, Zimet, & Farley, 1988), a 12-item self-report scale of respondents' perception of social support from family, friends, and a significant other. Responses are rated on a scale from 1 (*very strongly disagree*) to 7 (*very strongly agree*). These items were: 1) I can talk about my problems with my family. 2) I can talk about my problems with my friends. 3) There is a special person with whom I can share my joys and sorrows. The fourth item was taken from the postdeployment social support subscale of the Deployment Risk and Resilience Inventory (DRRI; King, King, & Vogt, 2003). This subscale consists of 15 items, with a response scale of 1 (strongly disagree) to 5 (strongly agree). The item used was: "There are people to whom I can talk about my deployment experiences." These four items were standardized and combined into one communication variable with an internal consistency (Cronbach's α) of .75.

Analytic Approach

We first conducted Confirmatory Factor Analyses (CFA) of the 17 items from the PCL in Amos 17.0 to compare the fit of each of the four PTS symptom cluster models: Traditional three-cluster model, Numbing model, Dysphoria model, and Five-factor model. In order to compare goodness of fit across five different PTS models, the Akaike Information Criterion (AIC) for each model was examined. The AIC is recommended in the literature as a good index of relative fit among non-nested models with the same manifest variables, where lower AIC values indicate a relatively better fitting-model (e.g., Hamaker, van Hattum, Kuiper, & Hoijtink, 2011; Vrieze, 2012).

After establishing the cluster model to be used, hypothesized relations between veterans' PTS symptom clusters and both partners' relationship satisfaction were explored via path analysis, again in Amos 17.0. Finally, we explored potential mediation of actor and partner effects of veterans' PTS symptom clusters on both partners' relationship satisfaction by veterans' report of communication and veterans' and partners' reports of veterans' overt aggression. Direct and indirect (via potential mediating variables) effects of PTS symptom clusters on relationship satisfaction were explored using bootstrapping, consistent with the approaches recommended by Preacher and Hayes (2004; 2008) and Macho and Lederman (2011). Bootstrapping produces more reliable effects and allows for the evaluation of the significance of indirect paths in mediation models. Because bootstrapping analyses require complete data, the sample for this final analysis was reduced to 181 participants. Independent sample *t*-tests comparing couples with full data to those with missing data showed no significant differences between the two groups for demographics and all variables listed in the model. In

addition, no substantive differences in the coefficients from path analyses conducted with and without bootstrapping were found.

RESULTS

Descriptive Variables and PTS Clusters

Veterans' mean score on the PCL was 30.60 (*SD* = 12.46). Approximately 11% of veterans met PTSD criteria according to the recommended cutoff score of 50 by the measure's original authors (Weathers, et al., 1993), with 28% of veterans meeting criteria based on more recent recommendations for a cutoff score of 35 (Bliese et al., 2008). Veterans' mean score on the RAS was 4.43 (*SD* = 0.62) and partners mean score on the RAS was 4.28 (*SD* = 0.72). Seventy-eight percent of veterans and 77% of partners rated that they were "satisfied" or "very satisfied" with their marital relationship.

Path Analyses

Results from the confirmatory factor analyses for each of the PTS cluster models are shown in Table 1. The Five-factor Model of PTS had the lowest AIC value and, thus, the best overall fit with our sample, relative to the other PTS symptom cluster models. Table 2 shows the correlations among the symptom clusters in the Five-factor model, both partners' relationship satisfaction, and all mediating variables. Relationship satisfaction for both veterans and partners was significantly, negatively correlated with all five PTS symptom clusters. Communication was significantly, positively correlated with both veterans' and partners' relationship satisfaction, as well as significantly, negatively correlated with all of the PTS symptom clusters except anxious-arousal. Finally, veterans' report of aggression and partners' report of veterans' aggression were

Table 1

Posttraumatic Stress Cluster Models

	AIC	RMSEA	CFI	NFI	χ^2	df	*p*-value
Three-cluster Model	624.00	.13	.84	.80	516.00	116	< .001
Numbing Model	521.16	.11	.88	.84	407.16	113	< .001
Dysphoria Model	458.38	.10	.91	.87	344.38	113	< .001
Five-factor Model	396.69	.08	.93	.90	274.69	109	< .001

Note. AIC = Akaike Information Criterion; RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index; NFI = Normed Fit Index; df = degrees of freedom.

Table 2

Correlations

	1	2	3	4	5	6	7	8	9
1) Reexperiencing									
2) Avoidance	.76**								
3) Numbing	.61**	.64**							
4) Dysphoric arousal	.59**	.53**	.60**						
5) Anxious Arousal	.74**	.56**	.47**	.57**					
6) Veterans' RAS	-.19**	-.20**	-.38**	-.27**	-.17*				
7) Partners' RAS	-.15**	-.27**	-.27**	-.19**	-.16*	.51**			
8) Veterans' Aggression	.41**	.35**	.34**	.38**	.40**	-.20**	-.15*		
9) Partners' Report of Veterans' Aggression	.21**	.21**	.17*	.27**	.30**	-.15**	-.35**	.56**	
10) Communication	-.20**	-.25**	-.41**	-.35**	-.14	.43**	.34**	-.16*	-.13

Note. RAS = Relationship Assessment Scale.

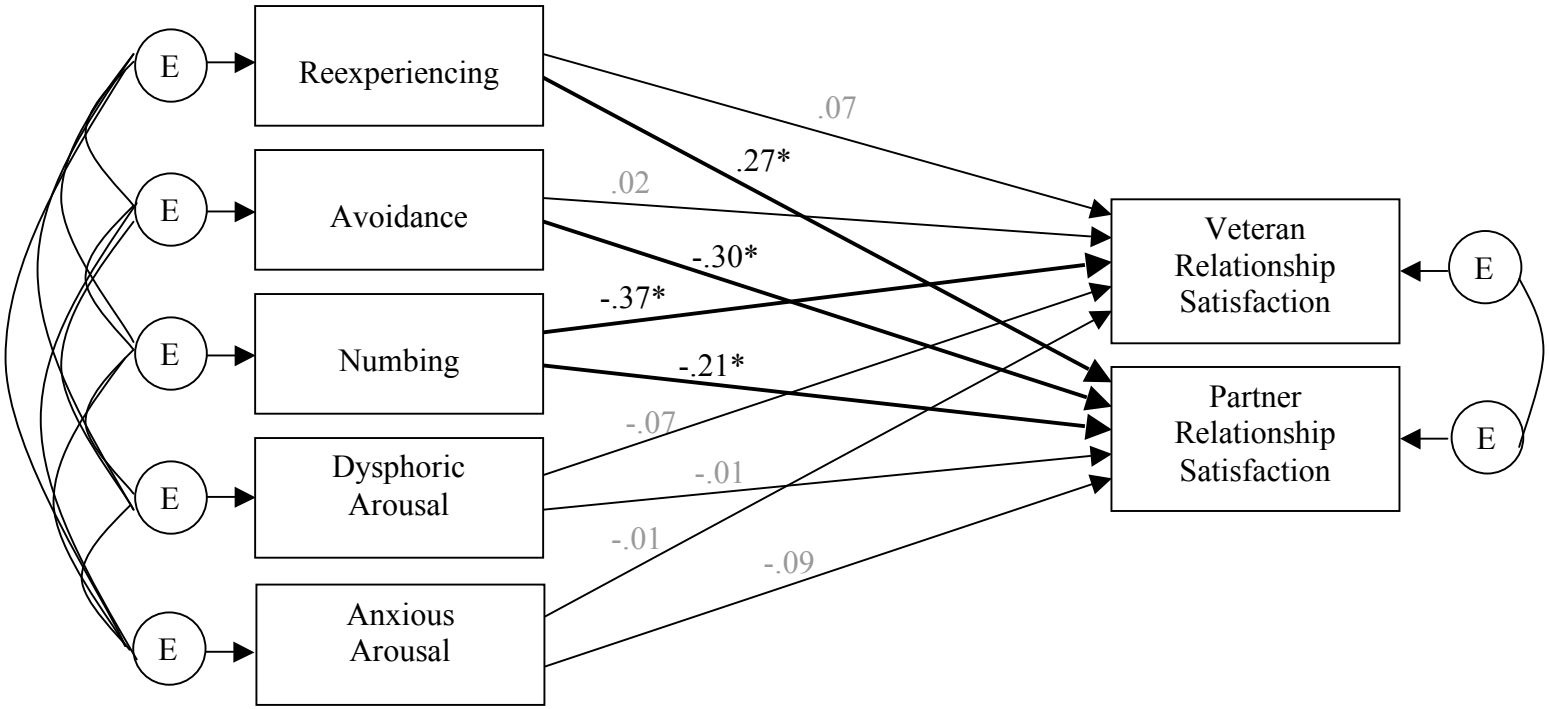
* $p < .05$. ** $p < .01$.

significantly, negatively correlated with relationship satisfaction, and they were significantly, positively correlated with all the PTS symptom clusters.

Figure 1 illustrates the path model exploring the associations of veterans' five PTS symptom clusters with both partners' relationship satisfaction, with standardized path coefficients displayed. Because the model was saturated, no fit indices were generated. There were significant, negative paths from the numbing symptom cluster to both veterans' and partners' RAS. In addition, there was a significant negative path from the avoidance symptom cluster to partners' RAS, and a significant, positive path from the reexperiencing symptom cluster to partners' RAS. All other paths were nonsignificant. These results were consistent with our hypothesis that emotional numbing would exert significant negative effects on both veterans' and partners' RAS; however, none of the hypothesized relations for the dysphoric or anxious arousal symptom clusters were significant.

Figure 2 illustrates the mediational path model with communication and self- and partner-reports of veterans' overt aggression included as mediators between veterans' PTS symptom clusters and veterans' and partners' RAS. Again, standardized path coefficients are shown. The model was an excellent fit for the data ($\chi^2[9] = 7.31$, $p = .61$; CFI = 1.00; NFI = 0.99; RMSEA = .00). All significant paths from the initial model maintained significance in this model: significant negative direct effects for the numbing cluster on both veterans' and partners' RAS, and additional significant direct effects for the reexperiencing (positive) and avoidance (negative) clusters on partners' RAS.

The numbing cluster also exerted a significant indirect effect on veterans' relationship satisfaction via communication, which accounted for 35% of the total effect



Note. *$p < .05$.

Figure 1. Five-factor PTS Symptom Model

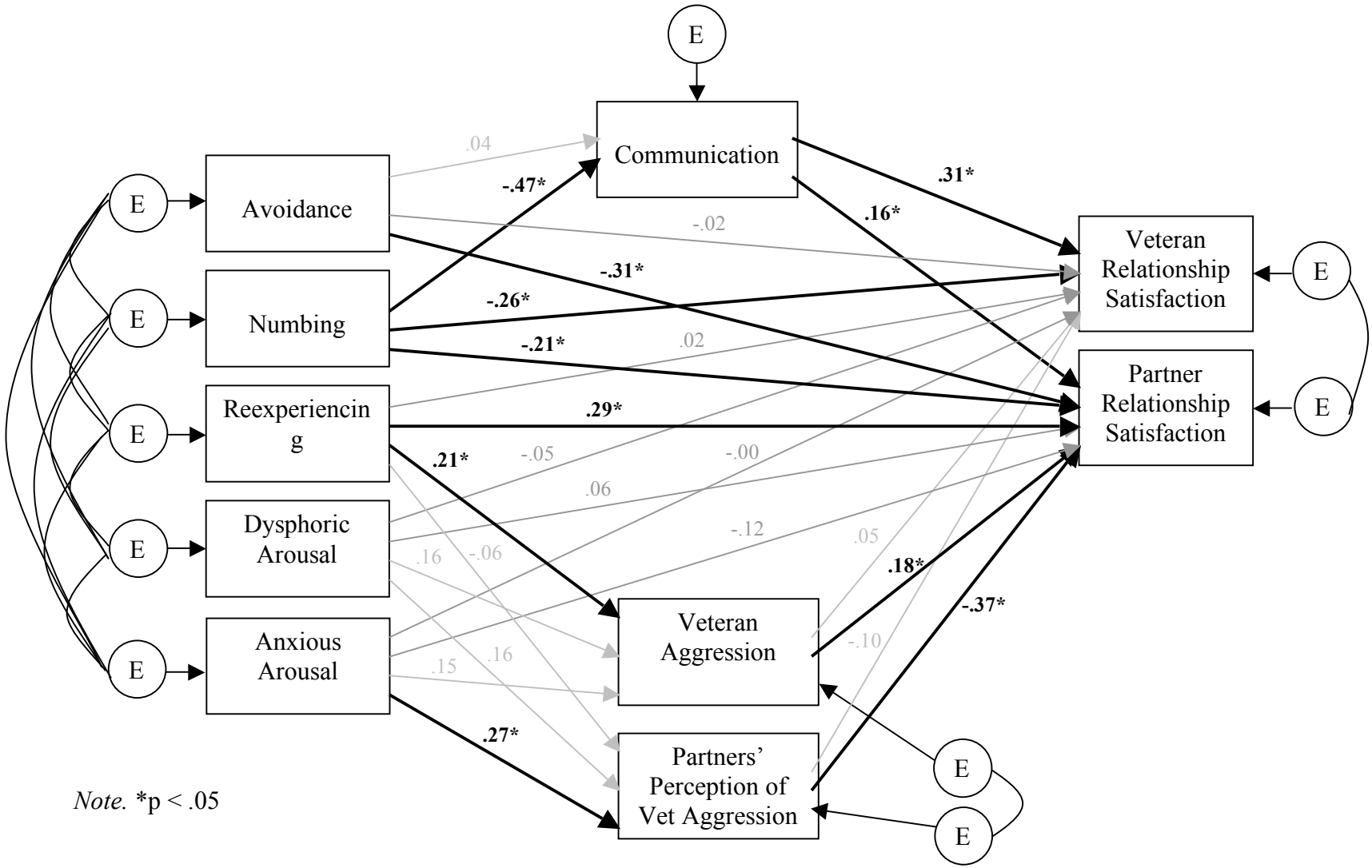


Figure 2. Five-factor PTS Symptom Model with Communication and Aggression as Mediator

(see Table 3 for the direct and indirect effects on veterans' RAS). For partners, the numbing cluster exerted a marginally significant indirect effect on relationship satisfaction via communication, which accounted for 25% of the total effect of numbing on partners' relationship satisfaction (see Table 4 for direct and indirect effects on partners' RAS).

Thus, decreased communication partially mediated the effect of numbing on

Table 3

Standardized Direct and Indirect Effects of PTS Symptom Clusters on Veteran Relationship Satisfaction

	Veterans' Relationship Satisfaction			
	Direct Effect	*Indirect Effect (via Communication)*	*Indirect Effect (via Vet Report of Aggression)*	*Indirect Effect (via Partners' Report of Vet Aggression)*
Avoidance	-.02	.01		
Numbing	-.26*	-.14*		
Reexperiencing	.02		.01	.01
Dysphoric Arousal	-.05		.01	-.02
Anxious Arousal	-.00		.01	-.03

* $p < .05$.

Table 4

Standardized Direct and Indirect Effects of PTS Symptom Clusters on Partner Relationship Satisfaction

	Partners' Relationship Satisfaction			
	Direct Effect	*Indirect Effect (via Communication)*	*Indirect Effect (via Vet Aggression)*	*Indirect Effect (via Partners' Perception of Vet Aggression)*
Avoidance	-.31*	.01		
Numbing	-.21*	-.07^		
Reexperiencing	.29*		.04	.02
Dysphoric Arousal	.06		.03	-.06
Anxious Arousal	-.12		.03	-.10*

* $p < .05$. ^ $p = .08$.

veterans' relationship satisfaction and showed a trend toward partially mediating the effect of numbing on partners' relationship satisfaction. Finally, there was no indirect effect of the avoidance cluster on partners' relationship satisfaction via communication; thus communication did not mediate the effect of the avoidance on relationship satisfaction.

In contrast to these effects, there were no significant indirect effects via

aggression for the reexperiencing cluster, the dysphoric-arousal cluster, or the anxious-arousal cluster on veterans' relationship satisfaction (see Table 4). There were also no significant indirect effects via aggression for the reexperiencing cluster or the dysphoric-arousal cluster on partners' relationship satisfaction (see Table 4). However, for partners, veterans' symptoms of anxious-arousal had significant total indirect effect on partner's relationship satisfaction via partners' report of veterans' aggression (see Table 4), despite the lack of an association between anxious arousal and partners' relationship satisfaction in the initial model. As expected, the indirect effect via partners' report of veterans' aggression was negative.

DISCUSSION

The current study investigated the associations of specific PTS symptom clusters with relationship functioning in both veterans and their partners from a dyadic perspective. This design allowed us to evaluate both partners' relationship functioning simultaneously while accounting for the interdependence in their responses. In addition, aggression and communication were explored as potential mechanisms through which PTS symptom clusters impact the relationship functioning of both veterans and their spouses.

Prior to examining these hypotheses, we evaluated which model of PTS symptom clusters best fit our sample of Iraq/Afghanistan veterans, and found that a five-factor model of PTS symptoms had the best relative fit. These findings are consistent with the recent line of research regarding PTS symptom factor structure, which is showing growing support for the superiority of the five-factor PTS model over the four-cluster numbing and dysphoria PTS models (e.g., Elhai, Biehn et al., 2011; Wang, Long, et al., 2011, Wang, Zhang, Shi, Zhou, Li, Zhang, Elhai, et al., 2011). From an interpersonal perspective, the five-factor PTS model may be optimal for providing information regarding the effects of PTS symptoms, given that each of these symptom clusters may affect relationships in unique ways. For example, several researchers have speculated that veterans' emotional numbing may lead to impaired communication as well as decreased empathy and emotional engagement (e.g., Cook, et al., 2004; Monson, et al., 2011). On

the other hand, symptoms of dysphoric or anxious arousal, such as difficulty sleeping and concentrating or jumpiness, may lead to increased hostility, short tempers, and stress (e.g., Orcutt, et al., 2003; Savarese, et al., 2001). Although both of these sets of outcomes could, in turn, contribute to poorer relationship functioning, these mechanisms are quite distinct. Differentiating between the mechanisms through which PTS symptoms impact relationships may help inform more targeted treatment approaches. For example, treatment for decreased emotional engagement could focus on identifying and expressing emotions, whereas treatment for hostility and stress could focus appropriate behavioral interventions for stress relief and anger management.

Using the five-factor model, the current study found that, as predicted, the numbing cluster had significant negative actor and partner effects, such that veterans' symptoms of emotional numbing were negatively associated with both their and their partners' relationship satisfaction. This is consistent with the literature reporting a robust effect for the association between emotional numbing and increased interpersonal distress (e.g., Cook, et al., 2004; Monson, et al., 2011; Riggs et al., 1998; Taft, et al., 2011), and it expands upon prior studies by examining both veterans' and partners' report of relationship functioning simultaneously. To date, only one other study has examined actor and partner effects of PTS clusters simultaneously (Erbes et al., 2012). Using the dysphoria model, these researchers found that the dysphoria symptom cluster significantly predicted relationship adjustment of veterans but not partners; however, their sample was small (49 couples), which may have limited their ability to detect partner effects. In addition, because Erbes and colleagues used the four-cluster dysphoria PTS model, in which emotional numbing is subsumed under dysphoria, it is possible that

the association of veterans' relationship functioning with dysphoria were driven by the emotional numbing symptoms in that cluster. Future research should attend to the specific effects of symptoms within the dysphoria cluster to clarify potential associations.

In addition to providing further evidence for the detrimental effect of numbing-related PTS symptoms, our results also revealed that decreases in veteran's level of communication (e.g., willingness to talk about problems with a partner, family, or friends) partially mediated the actor effect of numbing (with significant direct and indirect effects) and nearly partially mediated the partner effect of numbing (with a significant direct effect and marginally significant indirect effect). Although it may be that effects are stronger for veterans, the shared method variance for veterans' reports of PTS, communication, and relationship satisfaction also may explain the stronger direct and indirect effects of numbing for veterans relative to partners. Furthermore, it is possible that, when veterans become emotionally numb, they are less able to accurately report their own behavior and thus their perceptions may differ from those of their partners (see Campbell & Renshaw, 2012). Finally, as all the veterans in our sample were male, broader gender differences in communication may have played a role in this pattern of findings. Several studies have found that women are more likely to seek higher levels of emotional disclosure and display higher levels of demand and criticism, whereas men are more likely to withdraw (e.g., Eldridge, Sevier, Jones, Atkins, & Christensen, 2007; Gabriel, Beach, & Bodenmann, 2010). Thus, the male veterans in our sample may have been less attentive to decreases in their communication than their female partners were, which could have minimized the strength of findings for partners.

Regardless of the stronger effects in veterans relative to partners, the pattern was generally similar across both individuals in the couple. This overall pattern suggests that, for both partners, part of the impact of veterans' emotional numbing symptoms on relationship satisfaction is via a decrease in willingness and/or opportunities to talk to others, which may impede attempts to become emotionally engaged with ones' partner (e.g., Cook, et al., 2004; Monson, et al., 2009). This suggests that couples in which one partner suffers from PTS symptoms of numbing may benefit from treatment approaches that explicitly target communication within their relationship. Further research with better measures of communication, such as well-established and validated self-report measures, partner reports of veterans' communication, or laboratory observations of communication patterns, could clarify how different aspects of communication (e.g., general communication, trauma specific communication, positive/constructive vs. negative/destructive communication, etc.) impact relationship adjustment for couples where one partner is experiencing PTS symptoms. In addition, it is important to note that communication only accounted for a minority of the total effect of the numbing symptom cluster on both partners' relationship satisfaction. There are several other mechanisms (e.g., decreased sexual intimacy and empathy) through which PTS symptoms of emotional numbing might affect relationship functioning that also need to be addressed by future research.

In contrast to these actor and partner effects of numbing, the current study did not find any significant direct or indirect effects of the dysphoric-arousal symptom cluster on either veterans' and or partners' relationship satisfaction. Indeed, these effects were near zero. As discussed above, the significant associations of numbing, combined with the

negligible associations of dysphoric-arousal, raise the possibility that prior findings of negative associations between the dysphoria cluster and negative psychological sequelae (e.g., Erbes, et al., 2011) may have been driven primarily by the emotional numbing items of the dysphoria cluster. Further research differentiating between symptoms of numbing and dysphoria (e.g., by using the five-factor model of PTS symptoms) is needed with different traumatized populations (e.g., civilians, victims of natural disasters) and outcome measures (e.g., measures of psychological distress and social functioning) in order to examine whether our pattern of findings generalizes to other samples and populations.

Similar to dysphoric-arousal, the anxious-arousal PTS cluster was not directly associated with relationship satisfaction for either veterans or partners in path analyses. However, the mediational analyses did detect significant indirect effects of anxious-arousal on partners' relationship satisfaction via veterans' self-report and partners' report of veterans' aggression. Surprisingly, when accounting for both self- and partner-report of veterans' aggression, veterans' own self-report of aggression was *positively* associated with partners' relationship satisfaction, although this association was nonsignificant and near zero. In contrast, partners' report of veterans' aggression had the expected negative association with partners' relationship satisfaction, and this effect was significant. The detrimental effect of partner-reported aggression on partners' relationship functioning is consistent with prior literature documenting a negative indirect effect of hyperarousal on relationship functioning via reports of veterans' anger, physical and verbal aggression, or interpersonal violence (e.g., Byrne, & Riggs, 1996; Orcutt, et al., 2003; Savarese, et al., 2001; Taft, et al., 2007). PTS symptoms of anxious arousal may prime veterans to behave

reactively to environmental triggers. They may have difficulty controlling anger and may be more likely to express hostility and experience violent outbursts (e.g., Solomon, et al., 2008; Taft, et al., 2007). In turn, this increased aggression might lead to increased relationship conflict, a hostile environment, and difficulty negotiating shared responsibilities, all of which could contribute to decreased satisfaction for partners. Though symptoms of anxious-arousal, such as hyper-vigilance and being easily startled, are most often associated with veterans' distress (e.g., Hoge, et al, 2004), the current findings suggest that arousal may contribute to an overall increase in aggressive behaviors that can detrimentally affect partners' and veterans' relationship functioning. These findings highlight aggressive behaviors as another potential target for treatment interventions, such as anger management, for couples in which one partner exhibits PTS symptoms of anxious-arousal. In addition, these results highlight the value of obtaining partner reports of aggressive behaviors when studying aggression and interpersonal violence because perpetrators may not accurately report their aggressive behaviors.

Somewhat unexpectedly, the current study also found an additional negative effect for the avoidance cluster on partners' relationship satisfaction in both multivariate analyses. The association between the avoidance symptom cluster and interpersonal outcomes is robust in the literature, but only in studies using the DSM-IV three-cluster PTS symptom model, in which symptoms of avoidance are combined with symptoms of emotional numbing (e.g., Evans, et al., 2003; Shea, Vujanovic, Mansfield, Sevin, & Liu, 2010). To date, we are unaware of any study that has found significant relations between the avoidance cluster and interpersonal outcomes when symptoms of emotional numbing are differentiated from symptoms of avoidance. Thus, it is unclear whether this result is

due to the dyadic nature of our analyses and/or our use of the five-factor model of PTS, or is an artifact of our sample. Of note, Sherman, and colleagues (2005) described a cycle whereby avoidance symptoms may lead the veteran to become more socially isolated, after which the partner stays home with him in an effort to support the veteran, thus becoming more isolated herself. This cycle eventually leads to increased feelings of resentment, guilt, and blame within the couple. It is plausible that our findings reflect a similar pattern. The fact that the effect of avoidance arose for partners only may suggest that partners' are more sensitive to the sacrifices that result from situational avoidance. However, further research is needed to evaluate whether this finding is replicable and, if so, examine the processes that might be at play.

The current study also found a significant, positive association between the reexperiencing symptom cluster and relationship satisfaction for partners. Although unexpected, this result is consistent with recent studies by Erbes and colleagues (2012) and Renshaw and Caska (2012). The latter authors suggested that these results may be explained through an attributional perspective of partner distress. The attributional perspective posits that general symptoms of distress (e.g., numbing, dysphoria) are more easily misinterpreted as reflective of veterans' feelings towards their partner or the relationship and, thus, are more distressing to partners. In contrast, trauma-specific symptoms like reexperiencing are more clearly attributed to a mental illness resulting from a defined event (e.g., combat) and, thus, are less threatening to the interpersonal relationship. Partners are therefore more likely to become distressed about their relationship if they believe that veterans' PTS symptoms are reflective of problems in the relationship itself, whereas the ability to externally attribute veterans' PTS symptoms to a

trauma event may act a psychological buffer for partners. Future research into the effects of reexperiencing symptoms on partners' relationship functioning (when accounting for all other PTS symptoms) is needed to clarify this increasingly consistent pattern.

In sum, our study found that veterans were at greatest risk for poor relationship functioning when they reported higher levels of PTS numbing symptoms, and that this association was partially explained by decreased levels of overall communication. None of the other symptom clusters appeared to add to the prediction of veterans' relationship functioning. Partners were found to be at an increased risk for poorer relationship functioning when veterans reported higher levels of avoidance and numbing and *lower* levels of reexperiencing symptoms, as well as when partners themselves reported greater levels of aggressive behavior in veterans.

Although our study represents one of the most comprehensive looks at relationship satisfaction in combat veterans, there are a number of limitations that must be considered. First, almost all participants were Caucasian, educated (some college experience), married, religious, members of the National Guard or Reserves, and primarily located in one geographic region. Thus, the current results are not generalizable to the general population, or even the active duty military population. In addition, all couples were comprised of male veterans and female partners, and results may not generalize to female veterans and male partners, or to gay/lesbian couples. Furthermore, all couples were recruited at voluntary relationship enhancement workshops, potentially making this a biased sample with regard to limited levels of relationship distress that might have been present. The current study was also limited by cross-sectional methodology and limited measures. In particular, our operationalization of

communication was limited by the four items present in the study. Thus the current results reported for communication are preliminary at best; however, they do highlight a need to further pursue this line of research with empirically validated measures of communication within couples. The current study also only had one measure of relationship functioning focusing on satisfaction. There was no additional measure of the degree of negatives in the relationship (e.g., conflict, hostility). Therefore, the current study provided a one-dimensional snapshot of relationship functioning, without accounting for the myriad of factors that comprise overall relationship functioning (e.g., intimacy, criticism, relationship expectations, etc.). Future research would benefit from using multimodal methods of relationship functioning assessments, such as self-reports of a wider range of constructs, laboratory observation, and interviews.

These limitations notwithstanding, the current study highlighted the need to further investigate the intricate interplay between PTS symptoms, relationship satisfaction, and potential mediators for both veterans and their partners. With a growing awareness of the need to include partners in PTS treatment approaches (e.g., Monson & Fredman, 2012), more research is needed on the dyadic impact that PTS has on the couple. Moreover, a better understanding is needed of the mechanisms through which PTS impacts interpersonal relationships, especially as they relate to intervention targets for new treatment approaches. The current study suggests that there is a need for more research exploring communication and aggression, with a specific focus on both partners' reports of level of aggression within the relationship. Finally, further research is needed into whether and how situational avoidance might impact relationship satisfaction, and the potential implication that situational avoidance may contribute to increased emotional

numbing and withdrawal and subsequently lead to poorer outcomes. Studies that evaluate these variables with attention to *both* partners in the relationship have the potential to further our understanding of this vulnerable population and contribute to efforts to improve their individual and relationship functioning.

APPENDIX A

PRELIMINARY EXPLORATIONS

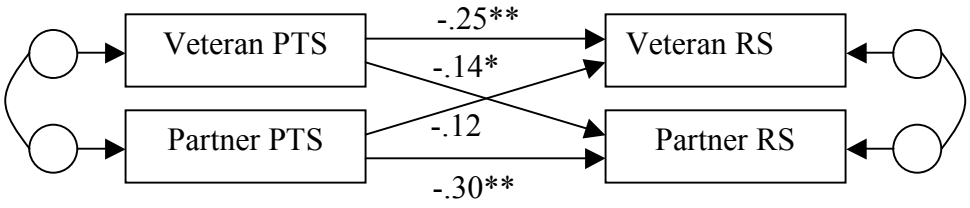
The current study had two overarching aims: 1) Examine the association of PTS symptom clusters with relationship functioning in both veterans and their partners, and 2) Examine potential mechanisms through which PTS symptom clusters are related to relationship functioning in veterans and partners. Before we began exploring the association of PTS symptom clusters with relationship functioning, we ran a basic actor-partner interdependence model (APIM) with each partner's total PTS score to each partner's relationship satisfaction (RS).

Partners completed the same measure of PTS as the veterans, the PTSD Checklist (PCL; Weathers, et al., 1993); however, they completed the "Specific" version rather than the "Military" version, meaning that they were directed to respond to a specific event that was not military-related. Instead, partners were directed to respond to this measure in regard to having heard or thought about veterans' stressful military experiences. The PCL demonstrates high internal consistency (Cronbach's α = .94) and convergent validity with the Clinician Administered PTSD Scale (r = .93; Blanchard, Alexander, Buckley, & Foreris, 1996). A score of 44 is recommended as a cutoff for possible presence of PTSD in civilian populations. The internal consistency of the PCL for the current sample was .92 for partners (all Cronbach's alphas for the relevant PCL subscales were greater than .74 for partners). Partners' mean score on the PCL was 26.30 (SD = 10.41).

Approximately 6% of partners in the current study met the recommended cutoff criteria of 44, indicative of PTSD in a civilian population.

The APIM exploring the relation between total PTS scores and relationship satisfaction is shown in Figure 3. Significant paths from both veterans' and partners' own PTS to their own relationship satisfaction were found demonstrating significant actor effects for PTS on relationship satisfaction. However, the only partner effect found was for the significant path between veterans' PTS and partners' relationship satisfaction. Because both partners' report of PTS exerted significant actor effects on their relationship functioning we then explored partners' PTS to determine if it mirrored the PTS factor structure found for veterans.

We used Confirmatory Factor Analyses (CFA) in Amos 17.0 to compare the fit of each of the four PTS symptom cluster models for partners' responses on the PCL: Traditional three-cluster model, Numbing model, Dysphoria model, and the Five-factor model. In order to compare goodness of fit across four different PTS models the Akaike



Note. PTS = Posttraumatic stress; RS = Relationship satisfaction

*$p < .05$; **$p < .001$

Figure 3. Actor-Partner Interdependence Model Examining the Relation between Veteran and Partner PTS and RS

Information Criterion (AIC) for each model was examined. The AIC is recommended in the literature (e.g., Hamaker, et al., 2011; Vrieze, 2012) as a good index of fit for the comparison of non-nested models, where lower AIC values indicate a better fit.

Similar to the results reported for veterans in the manuscript, the Five-factor PTS symptom model had the best fit for partners, followed by the Dyphoria model, as shown in Table 5. However, the overall fit of the Five-factor model was slightly less than adequate than for veterans (e.g., NFI = .86).

Due to the significant actor effects for both veterans' and partners' PSTD in the APIM, and the similar PTS symptom cluster model outcomes for both veterans and partners, we proceeded with the Hierarchical Linear Modeling (HLM 7.0) analytic approach that focused on actor and partner effects of *each individual's* PTS on relationship satisfaction.

Table 5

Comparison of Partners' PTS Symptom Cluster Models

	AIC	BIC	RMSEA	CFI	NFI	χ^2	df	P-value
Three-cluster Model	549.63	559.40	.11	.84	.79	441.63	116	<.001
Numbing Model	521.18	531.50	.11	.83	.79	407.18	113	<.001
Dysphoria Model	489.82	500.13	.10	.87	.82	375.82	113	<.001
Five-factor Model	419.55	430.58	.09	.91	.86	297.55	109	<.001

Note. AIC = Akaike Information Criterion; RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index; NFI = Normed Fit Index; df = degrees of freedom

APPENDIX B

HLM ANALYTIC APPROACH

HLM analyses focused on the available dyadic data for veterans and partners and explored the direct and indirect effects of the Five-factor PTS model on relationship satisfaction. In order to explore both actor and partner effects within these analyses, the data were structured such that each individual's data entries included their own PTS, as well as their partners' PTS. This was achieved by creating a Level One dataset where each member of the couple was entered as one unique case (i.e. turning a dataset of 213 couple cases into a data set of 426 individual cases), and a Level Two dataset that paired each case in the Level One dataset according to its couple identification number. Each individual case in this dataset had values for participants' PTS symptom clusters *as well as* that participants' partners' PTS symptom clusters. This allowed for dyadic modeling of actor *and* partner effects. HLM analyses then explored the hypothesized relations between the symptom clusters in the Five-factor PTS model to relationship satisfaction.

An example of the subsequent level 1 equation to examine the hypotheses was as follows:

Relationship Satisfaction = $\beta 0$ + $\beta 1$(Self PTS Reexperiencing) + $\beta 2$(Self PTS Avoidance) + $\beta 3$(Self PTS Numbing) + $\beta 4$(Self PTS Dysphoric arousal) + $\beta 5$(Self PTS Anxious arousal) + $\beta 6$(partners' PTS Reexperiencing) + $\beta 7$(partners' PTS Avoidance) +

β8(partners' PTS Numbing) + β9(partners' PTS Dysphoric arousal) + β10(partners' PTS Anxious arousal).

Please note that the "partners' PTS" variables (e.g., "partners' PTS Avoidance") are the self-reported PTS symptoms of each individual's partner. For example, for veteran participants in the current sample, "Self PTS Avoidance" was veterans' self-report of PTS avoidance, and "partners' PTS Avoidance" was the spouses'/partners' self-report of PTS avoidance. Conversely, for spouse/partner participants in the current sample, "Self PTS Avoidance" was the spouses'/partners' self-report of PTS avoidance, whereas "partners' PTS Avoidance" was the veteran's self-reported PTS avoidance. Thus, in the above equation, β1 – β5 represent the 'actor' effects of the PTS symptom clusters, and β6 - β10 represent the 'partner' effects of the PTS symptom clusters. Note that the dependency in these data are accounted for by the Level Two specification of couples.

Table 6 reports the final estimation of the actor and partner fixed effects for each of the coefficients in the Level One dataset, according to their Level Two dataset pairings. Overall there were significant negative actor effects for the Numbing and Dysphoric Arousal symptom clusters, and all of the partner effects were nonsignificant. These findings are contrary to our hypotheses of significant partner effects for the Numbing and Arousal symptom clusters.

In order to explore the hypothesis that veterans' PTS symptoms would affect partners' relationship satisfaction more than partners' PTS symptoms would affect veterans' relationship satisfaction (i.e., that partner effects would be stronger for spouse/partner participants than for veterans), interactions between the partner variables

Table 6

Actor and Partner Fixed Effects of PTS on Relationship Satisfaction

	β Coefficient	Standard Error	*p*-value
β0 (Intercept)	4.73	.08	< .001
β1 (Reexperiencing)	.02	.01	.07
β2 (Avoidance)	-.01	.03	.74
β3 (Numbing)	-.05	.01	< .001
β4 (Dysphoric arousal)	-.03	.01	< .05
β5 (Anxious arousal)	.01	.02	.74
β6 (partners' Reexperiencing)	.03	.05	.60
β7 (partners' Avoidance)	-.08	.05	.11
β8 (partners' Numbing)	-.06	.05	.24
β9 (partners' Dysphoric arousal)	-.02	.04	.70
β10 (partners' Anxious arousal)	.00	.05	.95

and a dichotomous variable identifying whether or not the subject was a veteran or a partner (i.e., Soldier0 = 0 for veterans, and Soldier0 = 1 for partners) were examined. The subsequent equation was as follows:

Relationship Satisfaction = β0 + β1(Self PTS Reexperiencing) + β2(Self PTS Avoidance) + β3(Self PTS Numbing) + β4(Self PTS Dysphoric arousal) + β5(Self PTS Anxious arousal) + β6(partners' PTS Reexperiencing) + β7(partners' PTS Avoidance) + β8(partners' PTS Numbing) + β9(partners' PTS Dysphoric arousal) + β10(partners' PTS Anxious arousal) + β11(Soldier0) + β12(partner's PTS ClusterX*Soldier0)

In this equation, as before, β1 – β5 are the actor effects, β6 – β10 are the partner effects, and β12 is the predicted interaction, where ClusterX represents each of the five symptom clusters for each respective analysis. If significant, each interaction was probed, with the expectation that the coefficients corresponding to partner effects of numbing and anxious-arousal (β8 and β10) would be stronger for partners than veterans.

Table 7 reports the final estimation of the actor and partner fixed effects and their interactions for each of the coefficients in the Level One dataset, according to their Level Two dataset pairings. Again, there were significant negative actor effects for the numbing symptom cluster, but dysphoric arousal was no longer significant. Like before, none of the partner effects were significant. However, there was a significant positive interaction for the reexperiencing symptom cluster, and a significant negative interaction for the avoidance symptom cluster. Our predicted interaction effects for the Numbing and Anxious Arousal symptom clusters were nonsignificant.

Table 7

Actor and Partner Fixed Effects of PTS on

Relationship Satisfaction with Interactions

	β Coefficient	Standard Error	*p*-value
β0 (Intercept)	4.88	.09	< .001
β1 (Reexperiencing)	.02	.01	.08
β2 (Avoidance)	-.00	.03	.89
β3 (Numbing)	-.05	.01	< .001
β4 (Dysphoric arousal)	-.03	.01	.06
β5 (Anxious arousal)	-.00	.02	.84
β6 (partners' Reexperiencing)	-.03	.06	.58
β7 (partners' Avoidance)	.06	.07	.39
β8 (partners' Numbing)	-.1	.07	.13
β9 (partners' Dysphoric arousal)	-.02	.06	.73
β10 (partners' Anxious arousal)	.07	.07	.31
Soldier0	-.17	.05	< .001
β11 (Ix Reexperiencing)	.19	.09	< .05
β12 (Ix Avoidance)	-.27	.09	< .01
β13 (Ix Numbing)	.06	.09	.45
β14 (Ix Dysphoric-arousal)	-.01	.08	.89
β15 (Ix Anxious-arousal)	-.10	.09	.27

Note. Soldier0 = variable identifying whether subject was a veteran or a partner; Ix = Interaction between symptom cluster and Soldier0.

We then probed the significant interactions by recoding the Veteran/Partner variable and found that the partner effect for the reexperiencing cluster was nonsignificant for both veteran participants (β = 0.02, *p* = .70) and partner participants (β = -0.04, *p* = 43); and that the partner effect for the avoidance cluster was nonsignificant for veteran participants (β = -0.00, *p* = .95) but significantly negative for partner participants (β = -0.15, *p* = .01).

These findings suggest that partners report higher levels of relationship satisfaction when their veteran reports higher levels of reexperiencing PTS symptoms. Recent research suggests that spouses who can attribute veterans' symptoms of psychological distress to concrete war trauma/events report improved relationship satisfaction (e.g., Renshaw, Blais, & Caska, 2011). Renshaw and Caska (2012) recently argued that reexperiencing symptoms may be more easily identified by partners as signs of a valid distressed reaction to an external traumatic event, which in the presence of other symptoms of PTS, helps mitigate distress in partners.

Furthermore, the results showing that higher levels of avoidance in veterans is related to lower levels of relationship satisfaction for spouses, indicates that, for the current sample, behavioral avoidance had a greater impact than emotional withdrawal and numbing. This latter finding is in stark contrast to the robust findings for the negative effects of numbing and dysphoria on relationship well-being in the PTS literature.

This general pattern held regardless of the cluster model used (e.g., using the numbing and dysphoria models), suggesting that either our sample was distinct from most prior samples, or that including partners' measure of PTS was somehow complicating the analyses. The current study asked partners to respond to questions on

the PTS Checklist in relation to their response to hearing about veterans' deployment experiences. These instructions may have lead the partner PTS measure to assess a greater degree of partners' reactions to veterans' PTS, as opposed to their own psychological distress due to PTS. This in turn may have impeded our ability to detect direct effects of veterans' PTS on partners' relationship satisfaction.

In addition, the HLM analytic approach for the current study was further complicated by the fact that the hypothesized actor and partner effects of PTS on relationship satisfaction are theoretically driven by the veterans' PTS, and not partners' PTS. Thus, the primary question is not whether each individual's PTS affects each individual's relationship satisfaction, but whether the veteran's PTS affects both the veteran's and partner's relationship satisfaction. However, this HLM approach incorporated the spouse's own self-reported level of PTS into the analysis, whereas, the literature typically uses only the veteran's self-reported level of PTS. This literature strongly supports veterans' PTS symptoms of emotional-numbing and/or dysphoria as being significantly related to relationship satisfaction. It is likely that spouses' own PTS introduced additional variance that may have accounted for part of the couples' relationship satisfaction in our results. Without a precedent example in the literature, it is difficult to determine whether the HLM results reflect actual relationships between the variables examined or are statistical artifacts of the mathematical approach used.

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